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XXVI. *Four Letters from Mr. T. S. Kuckhan, to the President and Members of the Royal Society, on the Preservation of dead Birds.*

Sir and Gentlemen,

Read May 24, 1770. **C**ONSIDERING the number of virtuosi, who apply themselves to the collecting natural curiosities of the insect, bird, and beast kinds, it is surprizing that so few have endeavoured to discover effectual means of preserving their curiosities, when collected; one would imagine that those Gentlemen, in particular, who write on natural history, would be exceedingly desirous of such effectual methods, which, if once discovered and communicated to the public, would be the means of their receiving many rare subjects, and even non-descripts from different parts of Asia, Africa, and America, which would afford infinite pleasure to naturalists, and greatly encourage the study of natural history. But instead of this, it is too common to see people, for want of knowing better methods, persevering in those which their own experience, and that of their acquaintance, daily convinces them are ineffectual: although they have the mortification of seeing their collections, which have been made with great trouble and

and expence, continually dropping into decay. I think I have tried most, if not all, the methods that have been published or practised for many years past, with all the care and attention I could, and it was not till after the loss of much time and many fine subjects, birds in particular, that I set myself to find out such methods, drugs, and liquors, as would effectually penetrate and perfectly cure all the parts, so as to keep them plump and full.

Before I proceed to describe my method of preservation, I shall beg leave to set down the objections I have to the present ways and the materials made use of in them: and first, with regard to that in which raw allum, common salt, and black pepper, are applied, I never could find those materials sufficient for a perfect preservation. They never fail to become humid in moist air and long continued wet weather; suffer the flesh to rot, and even corrode the wires made use of to confine the birds in their natural attitudes, till the whole drops to pieces on the least touch or motion. Salt naturally degenerates to a pickle; if the bird has been killed by shot, it will ouse through the shot holes. If it has been killed by hand, an incision must be made, in order to extract the intrails and put in the materials that are to effect the preservation. Now it is impossible to close that incision so tight, as to confine the pickle from creeping out, and whenever it does get out, it will infallibly spoil the plumage; or if, to prevent that, we hang up the birds by the feet, then the pickle will descend to the neck and head, before the upper parts in that situation are sufficiently cured; the certain consequence of which (in summer here, and at all seasons in hot

hot climates) will be, that maggots will be generated in such uncured parts, and of course the birds destroyed. Supposing however for a moment (what will scarce be found to happen once in a thousand tryals) that the pickle should penetrate and cure every part, we have then, What?—a bird preserved in its natural shape, dimensions, attitude, and colours. No, but we have a poor shriveled-up dried carcase of a bird, in which neither the natural shape, dimensions, or colours, are preserved, and which continually excites the disagreeable idea of the poor thing's having been starved to death on purpose. It is true the eyes look lively and in full preservation; and no wonder, for they are glass: they serve, however, by the contrast, to shew more strikingly the miserable condition of the rest of the body. One would have imagined that so palpable an absurdity, as the placing a fine full glistening eye in the head of a body, not only manifestly dead, but appearing to have perished by sickness or famine, would have been obvious to every body; to have kindly suffered the languid eyelids to close, would have at least avoided so ridiculous a contradiction. Lastly, experience shews that birds thus treated are seldom or never so cured, but that the flesh grows rank; that rankness invites the insects, and of course the bird is soon destroyed. A second method of preserving birds is, by immersing them in spirits, and if the barely keeping the carcase of birds from putrefaction is all that is required, I must own this method is an effectual one, and congratulate the naturalists on the facility with which they may now procure foreign birds. We have
nothing

nothing to do but send by sailors bound to different parts of the world, a few kegs of spirits, and we shall be sure of birds enough preserved in this manner; but then what becomes of their proportions, attitudes, graces, and in short, of every thing that gives them life and motion?

Another method is that of skinning birds; they had no other way in Germany and Holland, and it was generally practised in France till very lately, when the method of preserving by allum, salt and pepper, was published and recommended, of which I have already given my opinion. Skinning, compared with the other methods which I have mentioned, is no bad way, but yet it is subject to many objections: 1st, there is a great difficulty in skinning, especially small delicate birds, killed perhaps by large shot; 2d, most people will find it hardly possible to reduce the skins to their natural proportions and attitudes, particularly the necks which are often twice as long, when separated from the vertebræ as before; 3dly, the flesh and bones of the wings and rump must, after all, be left with the skin, and are as difficult to preserve as any other parts of the body. However, those who chuse to continue this method will find their interest in making use of the materials I shall recommend by and by, when I come to treat of my method of preservation, which I apprehend is more perfect than any of those which I have mentioned, not only in point of preservation, but also as it keeps the natural plumpness and proportions. These particulars I shall reserve for other letters, having already made this too long, which I yet must encrease by begging the candour of the Society for both,

as I am writing in a language of which I have very little knowledge. I am,

Learned Sir and Genlemen,

Your most obedient,

and very humble servant,

London, May 22, 1770.

T. S. Kuckahn.

L E T T E R II.

Sir and Gentlemen,

Read June 21, 1770. **I**N my former letter to the Society, I took the liberty to make some observations on the common methods of preserving birds; in this, and two succeeding letters, I shall endeavour to give a plain description of my method, previously requesting the candid indulgence of the learned Society, for the many inaccuracies which must inevitably slip from the pen of a foreigner, when writing in a language he is so little acquainted with. Before I describe the liquor and other materials which I make use of in preservations, it will be proper to premise some cautions and give such directions

tions as are necessary for preparing the birds that are to be preserved.

Those who shoot birds for that purpose, should always be provided with a quantity of cotton or fine tow, with which to stop the shot holes, and also the throat of the bird, to prevent the blood from fouling the feathers, which infallibly spoils them. If the birds are not quite killed by the shot, they should be immediately dispatched by pressing the thumb nail hard upon the wind-pipe, and care should always be taken to confine the wings as soon as possible, to prevent their fluttering. The birds when dead are to be carried by the legs, and not be crammed into nets or held by the neck, in which last position the weight of the body would stretch it beyond the natural proportion. When they are brought home, they should be hung up by the legs, and the stop of cotton taken carefully out of the throat, and a small stick put across between the bill, to keep it open, that the blood and slime may be discharged by the mouth without damaging the plumage. It is also necessary to observe the proper seasons when the birds are in the best condition for preservation, and when not: during the time of incubation, the breasts and bellies are without feathers, and the skin of those parts is extremely tender; again, while birds are moulting or casting their feathers, they are not fit for preservation, the quills are full of blood, and the plumage not of its proper colours. The best seasons are in the Spring and Autumn; but, if we meet with rare birds, we must not lose the opportunity at any season, but do as well as we can.

Young birds are not proper for preservation till the second year, because they do not, till then, acquire their proportions and colours, which may occasion their being mistaken for other species; neither is it always possible in the first year, to distinguish the sex of birds, which is very easy afterwards when they arrive at maturity; however, by grouping young birds in their nests, we may preserve them at any time, and when managed in that way they certainly add greatly to a collection.

This naturally leads me to what, in my opinion, is by much the most ingenious and entertaining part of this kind of study, I mean the attitudes and actions of birds; all the rest is merely mechanical, but this admits of fancy, taste, and judgment. Without a proper attention to this, however sound your preservation, how vivid soever the plumage may be, your birds are still nothing but meer dead birds; but by a skilful management of attitudes and actions, you, as it were, animate them, they seem alive, moving and acting, we

“ Listen attentive, wond’ring, that no sound
 “ Escapes the busy throng.”

Though this part certainly depends in a great degree on taste and judgment, yet an accurate observer of Nature will derive much information from noticing the appearance of living birds, in the attitudes and actions which he wishes to express in his preservations: the most picturesque attitude should be fixed upon, and propriety observed in chusing such as are most expressive of the particular qualities of each bird,

bird, as strength and courage in eagles and hawks, &c. In grouping birds of these kinds with their prey, regard should be had to the particular part at which they begin to devour it: some begin at the breast, some at the head, some at the back, and others extract the entrails first; the feeble scarce-resisting efforts and extreme terror of the prostrate bird, the exulting audacity and triumph of the victorious one, if properly managed, create a fine contrast. Picking, stretching, feeding, fear, surprize, and fighting, afford peculiar and striking attitudes. I fear the word *attitude* does not sufficiently express my idea; I mean the particular positions of the legs, wings, head, body, the manner of the feathers, and in general whatever contributes to express and mark a particular action and passion of the bird. Thus, in surprize attended with fear, the legs are extended, the body leans forward out of the equilibrium, supported almost on the toes, the wings are half expanded, the bill turned to one side, the top (if crested) spread, and the feathers, particularly those of the neck, standing perpendicular to the skin. When any part is not made to co-operate in the expression, we not only lose the additional strength which the proper action of that part would have given to the general expression, but, what is worse, the position of such deficient parts may convey an idea directly contrary to that general expression, and so make the whole unnatural, contradictory, and ridiculous. It is not unfrequent to see this absurdity in a degree that at once surprizes and offends a judicious observer. Birds put in such positions as are intended to express the strongest emotions

emotions and passions, with their feathers perfectly smooth and unaffected,

“ Rage with unruffled plumes and fear with folded
“ wings,”

and this absurdity is the more striking, and therefore the less excuseable, as the action of the wings and feathers are more intelligible and expressive than those of any other parts in birds. Great attention should always be had to the poize of the body: in such positions as a live bird may be supposed to continue some time in, we must take care that the body appears in equilibrium; on the contrary, in fighting and other violent actions, where a forceable motion is to be given, the appearance of equilibrium must be as carefully avoided, for it always conveys the idea of stillness, as do the legs when placed by each other, and in the same straight direction, which they should seldom if ever be in. Bending, advancing, or retiring, one leg a little more than the other, not only gives a more graceful but a more lively and active appearance; and it is observable that living birds, standing on a plain surface, almost always turn the foot of the leg on that side to which they are looking in the same lateral direction with the head. I cannot help observing here one fault very common with most preservers; that is, the stretching the legs of their birds down so as to bring the thigh almost perpendicular, which not only gives the bird an ungraceful but an unnatural appearance; for we seldom or never observe this in living birds, except in some particular species.

Birds

Birds appear to great advantage when picking their feathers; the tail is then expanded, the wing on that side to which the bill is turned lifted up, the other drooping down, and somewhat extended from the side, in order to balance the body. Birds when fighting afford endless variety of attitude and expression; but certainly never any so affecting as when grouped with, and feeding their young, whose clamorous hunger, expressed by their gaping mouths and extended pinions, occasion that anxious perplexity and tender joy of the mother bird, so strongly marked by the spreading tail, the drooping wings, and peculiar position of the head.

Having now set down all that I have to say on these matters, I shall, in my next letter, go immediately upon the method of preparing and applying the materials which I use in preservations. I am,

Sir and Gentlemen,

Your most obedient humble servant,

May 31, 1770.

T. S. Kuckahn.

L E T T E R III.

Sir and Gentlemen,

Read July 5, 1770. **I** NOW proceed to describe the materials which I use, in preserving birds, beasts, &c. and the methods of preparing them, *viz.*

For

For the liquid varnish, take raw turpentine 2 pounds
 camphor 1 pound
 spirit of turpentine 1 quart

Break the camphor into very small pieces, and put the whole into a glass vessel open at top, place it on a sand heat till thoroughly warmed, then increase the fire gradually till the ingredients are perfectly dissolved and mixed, which will be done in about half an hour. Great care must be taken that the materials do not catch fire: to prevent accidents, it would be better (especially where the process is made in the house) to place the glass vessel in another of any metal, two thirds filled with cold water, which place over a gradual fire till it boils, keep it so, till the ingredients are dissolved and incorporated; then take the glass off and let it stand to cool, and the liquor will be fit for use. This varnish is the only liquid which I use in making preparations.

For the dry compound take, *viz.*

corrosive sublimate	$\frac{1}{4}$ pound
saltpetre prepared	$\frac{1}{2}$ pound
alum prepared	$\frac{1}{4}$ pound
flowers of sulphur	$\frac{1}{2}$ pound
musk	$\frac{1}{4}$ pound
black pepper	1 pound
tobacco ground coarse	1 pound

Mix the whole well together, and keep it in a glass vessel, stopped close and in a dry place. To prepare the alum, place it on an iron plate over a fire, till it ceases boiling and becomes dry and hard; then take it off, and when cool pulverize it. This method

evaporates

evaporates the aqueous parts of the alum, and also renders it much less corrosive. The method of preparing saltpetre is the same as that of alum ; only the plate on which it is done must have an upright rim all round it, to prevent the salt running off into the fire.

In my next letter I shall go through the method of dissecting birds and other subjects, and give directions for applying the varnish and compound, with whatever else appertains to a perfect preservation.

I am, with great deference and respect,

Sir, and Gentlemen,

Your most obedient humble servant,

28 June, 1770.

T. S. Kuckahn.

LETTER IV.

Sir, and Gentlemen,

Read July 5, 1770. **I**N my last, I gave directions for preparing the materials, which I use in preservations. I shall now proceed to describe the method of applying them. If a bird is killed by hand, a stop of cotton must be put into the throat ; and if by shot, into each of the shot holes also,

VOL. LX. S f for

for reasons heretofore mentioned ; then lay the bird on its back upon a table covered with several folds of some soft cloth ; separate the feathers of the breast and belly very carefully, so that you may come at the skin, in which, about the middle of the breast, make an incision just big enough to introduce the end of a quill-barrel, which enter and blow strongly through, until the skin is entirely detached from the flesh. Continue the incision down along the belly to the anus, and contrary-wise up to the craw ; double back the skin on both sides, carefully guarding the plumage with cotton to prevent its being soiled during the operation ; and take out the craw. This done, run a sharp smooth skewer cross-ways through the breast, and lifting the bird up by it with the left hand, introduce with the other, one point of a sharp strong pair of scissors close by the edge of the breast-bone, and clip along by it, till the breast, together with the fleshy parts of the belly, are entirely separated, taking great care not to cut the intestines. These must be next extracted, and all the blood and other moisture dried up with cotton, sponge, or tow, with which the cavity of the body is to be filled. Then draw down the neck within the skin until you can come to the back of the skull, out of which cut a small piece, and extract the brains ; and having dried the cavity well with cotton, dip a hair pencil in the liquid varnish and wash it well therewith, and over it strew some of the dry compound and fill it up with cotton. Next apply the liquid to the outside of the skull close down to the root of the bill, and over that also strew some of the powder ; proceed in the same manner with the neck,

and

and then draw the skin back to its proper place, having first moistened it on the inside with the liquid.

We now proceed to the wings, the boney parts of which must be drawn so far on the inside of the skin as that we may come at the whole length. Cut out the most fleshy parts, or only make some longitudinal incisions into them, and apply the liquor and powder as before; then connect the two wings by small wire or strong thread well waxed; then (having removed the cotton that was put into the cavity of the body to imbibe the moisture) proceed in the same manner with the thighs, observing, if you cut away the flesh, to supply its place with cotton moistened with the varnish. In order to cure the rump, make as many incisions in it as may be, without weakening it too much, and having applied the materials as in the other parts, a sharp wire must be run into it, and continued along the under side of the back-bone, to about two thirds of the length of the body, in order to support the tail; then, with a pencil, varnish over the back and inside of the skin, and apply the powder. Stuff afterwards the cavities of the craw and body with the following herbs, *viz.*

Tansy	} of each an equal quantity well dried,
Wormwood	
Hops and Tobacco	

and cut small. The next thing is to take particular notice of the breast. Out of any soft free wood, cut an artificial one as near the shape of it as possible; which being fitted to its proper place, and moistened

with the varnish, must be overlaid with cotton ; and the skin be drawn over it, being first varnished on the inside. In sewing up the incision, observe to stick the needle always outwards ; as you proceed, moisten the seam with some of the liquid ; and when finished, dispose the feathers into their natural order. The eyes, must be extracted, as no art can preserve them, so as to look full and lively, for the aqueous humour will dry up and of consequence the outward tunica become shrivelled and without lustre. In extracting them, great care must be taken that none of the humour drop on the plumage, as it would spoil wherever it touched ; the best way is, to stick a sharp pointed awl through each of them and pluck them out together. They must be laid aside in order to finish the artificial eyes by. Chuse for that purpose beads of as large size as you can conveniently introduce into the orbits ; take a long slender needle threaded with strong silk waxed over, and run it through the hole in the upper part of the mouth and out at one of the eyes, leaving three or four inches of the silk hanging out at the bill. This done, put one bead on the thread, and run the needle out at the other eye ; draw the bead into the orbit, at the same time lifting up the eye-lid with a sharp needle, and place it over the edge of the artificial eye in a natural position ; then, with a pencil introduced from the other side, varnish all the cavity with the liquid, and fill the space between the eyes with cotton, so as to keep the bead already placed, in its proper place. Put on afterwards the other bead, and returning the needle through the orifice in the upper part of the mouth, draw in the other eye, to its proper orbit,
lifting

lifting up the lid as before. If the eyes are not sufficiently protuberant, you may introduce more cotton by the orifice, through which the threads lead; and when you have by this means fixed the eyes properly, tie the ends of the silk, and cut them off. There is another method of setting the eyes, which is by introducing the beads by the orifice in the roof of the mouth, and when they are placed, stuffing cotton through the same passage to keep them firmly in their places. The stop of cotton must now be taken out of the throat, and some of the same material thrust down very carefully by little at a time, with a quill, to support the neck in its plumpness when it becomes dry. We now come to the methods of placing and retaining the birds in the attitudes we would have them; and first, we must provide the legs with wires sufficient to support the weight of the body, which is done in this manner. Take a brass or iron wire of a proper thickness, and made sharp at the point; which run through the foot up the leg and thigh, through the cavity of the body, on the inside of the wooden breast, and so up the neck, and out at the upper part of the head, just above the bill. The point being then made very slender, and turned back like a hook, take hold of the other end of the wire below the foot, and draw it back till the hooked point has fixed in the head, and by it you may adjust the length and position of the neck and head. (N. B. the wire which is put through the other foot and leg, &c. need not extend to the head, half way along the body will be sufficient). Next prepare a piece of wire for supporting the tail; this must be about two-thirds

thirds the length of the whole body; sharpen it at one end and bend the other like a hook, run in the sharp end just below the rump, and push it along under the back-bone till the hook is firmly fixed over the rump, amongst the large feathers of the tail. The next thing is, to fix the bird on the perch or branch, on which you would have it stand; in this you will make two holes at the distance you propose the feet to be, and after having inserted the wires which are run through the feet and legs, bend the legs and every other part into the attitude you would have them. The wings must also have a wire to themselves, in order to keep them in the designed position; this is done by sharpening the wire at one end and running it first through one wing and through the body, out at the other wing, both being in their proper places: then the feathers must be disposed in the manner most proper to the position of each part, and the expression intended to be conveyed. The feet and bill may be varnished over with the same sort of varnish that is used for the preservation. The bird must then stand for a day or two in an airy place for the varnish to penetrate and fix; and lastly, the bird must be baked in an oven, it is not absolutely necessary, but as it makes them dry, and finishes the preservation immediately: moreover if the bird has been sometime dead and has any disagreeable smell, this method makes it perfectly sweet; but care must be taken not to put them into the oven while it is too hot, as it would blister the bill and nails. The best rule to know when the oven has a proper degree of heat is this: while the oven is cooling, throw in now and then a tail feather taken from any fowl,
which

which must be placed about the middle of the oven. If it is too hot, the feather will have a motion and be bent : we must therefore wait a while, and put in another feather, till we observe there is no motion or bending ; then upon taking it out, and bending it with our finger, if it breaks, the oven is still too hot, and we must wait till feathers that have been in for a few minutes will bend without breaking. When the oven is thus fit, the birds must be put in, and the door of the oven closed, till it is quite cooled. The birds in this manner will be perfectly preserved ; but as there still remains some oily matter in the feathers, the moths and other insects will deposit their eggs and generate their young in the plumage, if the birds are not carefully cased up. The cases must be first well washed on the inside with the following camphorated spirits, *viz.* Take one pound of camphor and boil it in half a gallon of spirit of turpentine till well dissolved ; and while hot, wash all the inside of the cases by means of a brush, and, as soon as dry, place your birds in, and close it up, and guard the joints of the doors or seams with paper or putty. N. B. Though the room, in which the cases of birds, &c. are kept, cannot be too dry, the sun should not be permitted to shine in, as it will certainly discharge the finer colours of the plumage.

Baking is not only useful in fresh preservations, but will also be of very great service to old ones, destroying the eggs of insects ; and it should be a constant practice once in two or three years, to bake them over again, and to have the cases fresh washed, as above, which would not only preserve collections from decay much longer, but also keep them sweet.

I shall probably find some other opportunity to communicate my method of preserving quadruped animals, fishes, and the halves of birds, for pictures.

I am, with great deference and respect,

Sir, and Gentlemen,

Your most obedient

humble servant,

London, July 5, 1770.

T. S. Kuckahn.